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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/743,851	12/22/2003	Jean-Marie Tran	871.0118.U1(US)	9087
29683	7590	05/01/2006	EXAMINER	
HARRINGTON & SMITH, LLP			WILLIAMS, LAWRENCE B	
4 RESEARCH DRIVE			ART UNIT	PAPER NUMBER
SHELTON, CT 06484-6212			2611	

DATE MAILED: 05/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/743,851

Applicant(s)

TRAN, JEAN-MARIE

Examiner

Lawrence B. Williams

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 April 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 33 is/are allowed.
- 6) ☒ Claim(s) 1-3, 6, 8-25, 28 and 30-32 is/are rejected.
- 7) ☒ Claim(s) 4, 5, 7, 26, 27 and 29 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 April 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. This application has been filed with informal drawings, which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

Specification

2. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

3. Claim 6 is rejected under 35 U.S.C. 112, second paragraph. Claim 6 recites the limitation "the inverse" in line 2. There is insufficient antecedent basis for this limitation in the claim. The examiner suggests applicant uses "the inverse matrix operation" as used in claim 5.
4. Claim 12 is rejected under 35 U.S.C. 112, second paragraph. Claim 12 recites the limitation "said transmitter" in line 2. There is insufficient antecedent basis for this limitation in the claim.
5. Claim 13 is rejected under 35 U.S.C. 112, second paragraph. Claim 13 recites the limitation "said transmitter" in line 2. There is insufficient antecedent basis for this limitation in the claim.

6. Claim 15 is rejected under 35 U.S.C. 112, second paragraph. Claim 15 recites the limitation "said deconvolution searcher" in line 1. There is insufficient antecedent basis for this limitation in the claim. The examiner suggests applicant use "said deconvolution searcher block" as used in claim 10.

7. Claim 16 is rejected under 35 U.S.C. 112, second paragraph. Claim 16 recites the limitation "said deconvolution searcher" in line 1. There is insufficient antecedent basis for this limitation in the claim. The examiner suggests applicant use "said deconvolution searcher block" as used in claim 10.

8. Claim 17 is rejected under 35 U.S.C. 112, second paragraph. Claim 17 recites the limitation "said deconvolution searcher" in line 1. There is insufficient antecedent basis for this limitation in the claim. The examiner suggests applicant use "said deconvolution searcher block" as used in claim 10.

9. Claim 19 is rejected under 35 U.S.C. 112, second paragraph. Claim 19 recites the limitation "the inverse" in line 2. There is insufficient antecedent basis for this limitation in the claim. The examiner suggests applicant uses "the inverse matrix operation" as used in claim 18.

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10. Claim 28 is rejected under 35 U.S.C. 112, second paragraph. Claim 28 recites the limitation "the inverse" in line 2. There is insufficient antecedent basis for this limitation in the claim. The examiner suggests applicant uses "the inverse matrix operation" as used in claim 27.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 1-3, 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art in view of Golovin et al. (US Patent 6,177,907 B1).

(1) With regard to claim 1, Applicant's Admitted prior Art teaches a method to receive a code division multiple access (CDMA) signal from a radio channel, comprising: inputting a CDMA signal received through the radio channel to a searcher; and processing the received signal in the searcher to obtain a multi-path profile of the radio channel. Applicant's Admitted Prior art does not explicitly teach where processing comprises at least partially removing an effect of at least one of a transmit and a receive filter on the multi-path profile, though the prior art does teach "a conventional searcher produces the multi-path profile using a convolution of the transmit/receive filters and the radio channel" (pg. 2, lines 3-4). By using convolution the prior art is in fact applying a concept of matched filtering; ie; applying filter with an impulse response which is a time-reversal version of the transmit filter which amounts to applicant's "removing an effect of at least one of a transmit and a receive filter on the multipath profile".

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However, Golovin et al. teaches in Fig. 5, an searcher (401) with pulse shape deconvolution (403) where processing comprises at least partially removing an effect of at least one of a transmit and a receive filter on the multi-path profile.

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Golovin et al. as a method of improving AD-AOA estimation in the presence of low SNR conditions.

(2) With regard to claim, Applicant's Admitted Prior Art also teaches a method as in claim 1, further comprising outputting the multi-path profile to a controller for use in making demodulator finger assignments (pg. 1, lines 16-18).

(3) With regard to claim 3, Golovin et al. also discloses in Fig. 5, a method as in claim 1, where at least partially removing comprises passing the received CDMA signal through a filter selected to have a filter characteristic that approximates an inverted amplitude or power response (magnitude squared block) of the at least one of the transmit and a receive filter.

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Golovin et al. as a method of improving AD-AOA estimation in the presence of low SNR conditions.

(4) With regard to claim 8, Golovin et al. also teaches in Fig. 5, where at least partially removing is performed by searched hardware (403).

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Golovin et al. as a method of improving AD-AOA estimation in the presence of low SNR conditions.

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(5) With regard to claim 9, though Golovin et al. does not explicitly teach the at least partially removing is performed by a data processor that is external to the searcher, such a method would be a design choice of applicant since the effect would be the same, ie, pulse shape deconvolution to remove the effects of the transmit/receive filter. Golovin et al. does teach the searches implemented in a variety of implementations (col. 4, lines 60-66).

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Golovin et al. as a method of improving AD-AOA estimation in the presence of low SNR conditions.

13. Claims 10-16, 21-25, 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art in view of Golovin et al. (US Patent 6,177,907 B1).

(1) With regard to claim 10, Applicant's Admitted Prior Art teaches in Fig. 2, an apparatus to receive a code division multiple access (CDMA) signal from a radio channel, comprising: a receiver front end (106) for receiving a CDMA signal from the radio channel; said receiver front end comprising at least one receiver filter (106A-B) and outputting a digital representation of a radio channel multi-path profile to a control function (pg. 1, lines 16-18).

However, Applicant's Admitted Prior Art does not teach a deconvolution searcher block having an input coupled to an output of the receiver front end for inputting a received signal and an output for outputting a digital representation of a radio channel multi-path profile to a control function, said deconvolution searcher block comprising a unit for processing the received signal to at least partially remove an effect of at least said receiver filter on the multi-path profile.

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However, Golovin et al. teaches in Fig. 5, a deconvolution searcher block (501) having an input coupled to an output of a receiver front end for inputting a received signal and an output for outputting, said deconvolution searcher block comprising a unit (403) for processing the received signal to at least partially remove an effect of at least said receiver filter on the multi-path profile.

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Golovin et al. as a method of improving AD-AOA estimation in the presence of low SNR conditions.

(2) With regard to claim 11, Golovin et al. also discloses where said unit (403) for processing the received signal also at least partially removes an effect of a transmitter filter on the multi-path profile. The spreader of Golovin et al. uses pulse shaping deconvolution apparatus. It is well known that the transmit filter incorporates convolution and pulse shaping and thus the pulse shaping deconvolution would at least partially remove an effect of the transmitter filter.

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Golovin et al. as a method of improving AD-AOA estimation in the presence of low SNR conditions.

(3) With regard to claim 12, Applicant's admitted prior art also discloses where said receiver is located at a mobile station (pg. 1, line 16), and where said transmitter is located at a base station (pg. 2, line 3).

(4) With regard to claim 13, though Applicant's Admitted Prior Art discloses the transmitter and receiver in opposite locations, one skilled in the art would inherently apply the

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prior art to both base and mobile since both comprises transceivers and thus realize the same problem.

(5) With regard to claim 14, Applicant's Admitted Prior Art also teaches where said control function uses the multi-path profile when making demodulator finger assignments (pg. 1, lines 16-18).

(6) With regard to claim 15, Golovin et al. also discloses in Fig. 5, a filter having a filter characteristic that approximates an inverted amplitude response (magnitude squared apparatus) of at least said receiver filter.

(7) With regard to claim 16, Golovin et al. also discloses in Fig. 5, where said unit of said deconvolution searcher comprises a filter having a filter characteristic that approximates an inverted response (pulse shape deconvolution, 403) of said receiver filter and said transmitter filter.

(8) With regard to claim 21, claim 21 discloses limitations similar to those disclosed in claim 10. Therefore a similar rejection applies.

(9) With regard to claim 22, claim 22 discloses limitations similar to those disclosed in claim 11. Therefore a similar rejection applies.

(10) With regard to claim 23, claim 23 discloses limitations similar to those disclosed in claim 14. Therefore a similar rejection applies.

(11) With regard to claim to 24, claim 24 discloses limitations similar to those disclosed in claim 15. Therefore a similar rejection applies.

(12) With regard to claim 25, claim 25 discloses limitations similar to those disclosed in claim 16. Therefore a similar rejection applies.

(13) With regard to claim 30, Golovin et al. also teaches in Fig. 5, where at least partially removing is performed by searched hardware (403).

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Golovin et al. as a method of improving AD-AOA estimation in the presence of low SNR conditions.

(14) With regard to claim 31, though Golovin et al. also discloses where said unit is implemented in control function software (col. 4, lines 60-66).

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Golovin et al. as a method of improving AD-AOA estimation in the presence of low SNR conditions.

14. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art in view of Golovin et al. (US Patent 6,177,907 B1).

Applicant's Admitted Prior art discloses in a mobile station, a method to reduce an amount of data provided to a finger assignment algorithm, comprising: inputting a CDMA signal received through a radio channel to a searcher; and processing the received signal in the searcher to generate output data for the finger assignment algorithm that represents a multi-path profile of the radio channel, where processing comprises passing the received CDMA signal through a filter selected to have a filter characteristic that approximates an inverted response of at least one of a base station transmit filter.

Applicant's Admitted Prior art is silent as to at least one mobile station receive filter so as to reduce an occurrence of multi-path sidelobes in the output data.

However, Golovin et al. discloses in Fig. 5, at least one mobile station receive filter (element 403) used to reduce an occurrence of multi-path sidelobes (Fig. 7) in the output data.

It would have been obvious to one skilled in the art at the time of invention to incorporate the teachings of Golovin et al. as a method of improving AD-AOA estimation in the presence of low SNR conditions.

Allowable Subject Matter

15. Claim 33 is allowed.

16. Claims 4-5, 7, 26-27, 29 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

17. Claims 6, 17- 20, 28 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

18. The following is a statement of reasons for the indication of allowable subject matter:
The instant application discloses a method and apparatus for receiving a CDMA signal from a radio channel. A search of the prior art has failed to teach a method or apparatus comprising:
“ processing the received signal in the searcher to generate output data for the finger assignment algorithm that represents a multi-path profile of the radio channel, where processing comprises passing the received CDMA signal through a processor unit that operates in accordance with a least squares criterion to derive the radio channel multi-path profile x from a searcher profile y,

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where $y = F * x + v$, where v is a noise vector and F is a transmit/receive matrix, so as to reduce an occurrence of multi-path sidelobes in the output data” as disclosed in claim 33 or “where at least partially removing comprises passing the received signal through a processing unit that uses a least squares criterion to derive the radio channel multi-path profile x from a searcher profile y , where $y = F * x + v$, where v is a noise vector and F is a transmit/receive matrix” as disclosed in claims 4, 17, 26.

Conclusion

19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a.) Tran discloses in US Patent 6,269,075 B1 Finger Assignment In A CDMA Rake Receiver.

b.) Sriram et al. discloses in US Patent 6,792,031 B1 Method For Maintaining Timing In A CDMA Rake Receiver.

c.) Kenny discloses in US Patent 6,144,691 Method And Apparatus For Synchronizing To A Direct Sequence Spread Spectrum Signal.

d.) Masenten discloses in US 2004/0151238 A1 Method And Apparatus For Canceling A Transmit Signal Spectrum In A Receiver Bandwidth.

e.) Wang et al. discloses in US 2004/0229637 A1 Subtractive Multipath Delay Detection.

f.) Wang et al. discloses in US 2001/0028677 A1 Apparatus And Methods For Finger Delay Selection In A Rake Receivers.

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g.) Kontola discloses in US Patent 6,792,035 B2 Method And Apparatus For Reducing The Effect Of Multipath Propagation In A Received Signal.

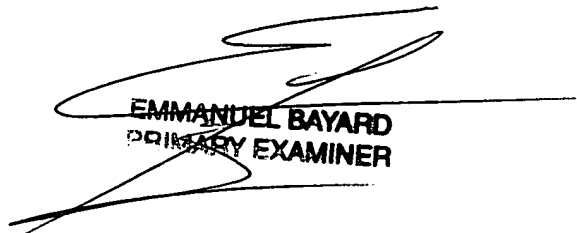
20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lawrence B Williams whose telephone number is 571-272-3037. The examiner can normally be reached on Monday-Friday (8:00-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ghayour Mohammad can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lawrence B. Williams

lbw
April 28, 2006


EMMANUEL BAYARD
PRIMARY EXAMINER